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- b) passing the precursor film between at least one pair of interdigitating grooved rollers to stretch the precursor film, the rollers being heated to a temperature range of from 160°F to 220°F, so that the precursor film contacting the rollers is heated and stretched to produce a breathable film having permanent elongation, the breathable film having a WVTR greater than 200 g/m²/day at 38°C and 90% relative humidity.

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The process of claim ~~51~~¹¹ wherein the polyolefin is selected from the group consisting of polypropylene, polyethylene, ethylene α -olefin copolymers and combinations thereof.

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The process of claim ~~51~~¹¹ wherein the rollers are heated to a temperature range of from about 180°F to about 200 °F.

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The process of claim ~~51~~¹¹ wherein at least one of the polymer compositions comprises an elastomer.

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A process for producing a breathable film having a WVTR of at least 200 g/m²/day at 38°C and 90% relative humidity comprising a polyolefin blend, the polyolefin blend having at least a first and a second polymer composition, and a filler, the process comprising:

- a) extruding a precursor film from the polyolefin blend comprising the first and the second polymer compositions and the filler, the filler concentration being in a range of from about 16.5 wt% to about 71.5 wt% of the polyolefin blend, wherein,
- i) the first polymer composition is a polyolefin selected from the group consisting of polyethylene, polypropylene, and combinations thereof, and
- ii) the second polymer composition is selected from the group consisting elastomers, high density polyethylene, and combinations thereof, and
- b) passing the precursor film between at least one pair of interdigitating grooved rollers to stretch the precursor film, the rollers being heated to a temperature range of from 160°F to 220°F, so that the precursor film contacting the rollers

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is heated and stretched to produce the breathable film having permanent elongation, so that the breathable film has:

- i) a WVTR in a range of from about 200 g/m²/day to about 10,000 g/m²/day at 38°C and 90% relative humidity, and
- ii) an elongation selected from the group consisting of machine direction, transverse direction and combinations thereof in a stretching ratio from about 1:2 to about 1:5.

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~~56~~ 6 The process of claim ~~55~~ 5 wherein the elastomer is selected from the group consisting of styrene-isoprene-styrene, styrene-butadiene-styrene, ethylene alpha-olefin rubber, ethylene alpha olefin diene monomer rubber, butyl rubber, natural rubber and combinations thereof.

~~57~~ 7 The process of claim ~~55~~ 5 wherein the high density polyethylene is at least one ethylene α -olefin copolymers wherein the α -olefin comonomer is selected from the group consisting of butene, pentene, hexene, and combinations thereof.

~~58~~ 8 The process of claim ~~55~~ 5 wherein the interdigitating grooved rollers are positioned in a direction selected from the group consisting of machine direction, transverse direction and combinations thereof.

~~59~~ 9 The process of claim ~~55~~ 5 further comprising forming the film of step b) into a fabricated article selected from the group consisting of diapers, adult incontinence devices, surgical apparel, surgical drapes, and house wraps.

~~60~~ 10 The process of claim ~~55~~ 5 wherein the precursor film has been embossed to impose thereon a pattern of multiple film thickness prior to having been passed between the at least one pair of interdigitating grooved rollers.

~~61~~ 11 The process of claim ~~55~~ 5 wherein the WVTR is greater than 1000 g/m²/day at 38°C and 90% relative humidity.

~~62~~ 12 The process of claim ~~55~~ 5 wherein the precursor film contacts the surface of one of the interdigitating grooved rollers that has been heated in the range of from 160°F to

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220°F for at least one-fourth of a revolution before entering the nip between the pair of interdigitating grooved rollers providing for heating of the precursor film before entering the nip of the rollers.

I⁴ 63. 55 The process of claim 55 wherein the initial basis weight (weight/area) of the precursor film is from 1.1 to 4 times the basis weight of the film after stretching.

14 64. 55 The process of claim 55 wherein the initial basis weight (weight/area) of the precursor film is greater than the basis weight of the film after stretching.

I⁵ 65. 55 The process of claim 55 wherein the precursor film is preheated and is at least 160°F as the precursor film begins passing through the at least one pair of interdigitating grooved rollers.

66. 55 The process of claim 55 wherein the second polymer composition comprises an elastomer.

17 67. A process for producing a breathable film composite, comprising the steps of:

providing a film composite having at least a first layer and a second layer, the first layer comprising a polyolefin film, the polyolefin film comprising a polyolefin composition and a filler, the filler concentration in a range of from about 16.5 wt% to about 71.5 wt% of the polyolefin composition; and

simultaneously passing the first layer and second layer between at least one pair of interdigitating grooved rollers having a surface temperature of from 160°F to 220°F to produce a film composite having a WVTR greater than 200 g/m²/day at 38°C and 90% relative humidity.

24 68. A process for producing a breathable film composite, comprising the steps of:

providing a film composite having at least a first layer and a second layer, the first layer comprising a polyolefin film, the polyolefin film comprising a polyolefin composition with a filler concentration in a range of from about 16.5 wt% to about 71.5 wt% of the polyolefin composition, the second layer comprising a material selected from the group consisting of woven fabric, non-woven fabric, knit fabric, and combinations thereof; and

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69 simultaneously passing the first layer and the second layer between at least one pair of interdigitating grooved rollers having a surface temperature of from 160°F to 220°F to produce a film composite having a WVTR greater than 200 g/m²/day at 38°C and 90% relative humidity.

A process for producing a breathable film composite, comprising the steps of:

providing a film composite having at least a first layer and a second layer, the first layer comprising a polyolefin film, the polyolefin film comprising a polyolefin composition with a filler concentration in a range of from about 16.5 wt% to about 71.5 wt% of the polyolefin composition, the second layer comprising a material selected from the group consisting apertured film, three-dimensional formed film, film laminates, a second polyolefin film, and combinations thereof; and

simultaneously passing the first layer and the second layer between at least one pair of interdigitating grooved rollers having a surface temperature of from 160°F to 220°F to produce a film composite having a WVTR greater than 200 g/m²/day at 38°C and 90% relative humidity.

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67 The process of claim 67 wherein the step of passing the layers between at least one pair of interdigitating grooved rollers further comprises contacting the composite with the surface of one of the interdigitating grooved rollers that has been heated in the range of from 160°F to 220°F for at least one-fourth of a revolution before entering the nip between the pair of interdigitating grooved rollers providing for heating of the precursor film before entering the nip of the rollers.

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68 The process of claim 68 wherein the step of passing the layers between at least one pair of interdigitating grooved rollers further comprises contacting the composite with the surface of one of the interdigitating grooved rollers that has been heated in the range of from 160°F to 220°F for at least one-fourth of a revolution before entering the nip between the pair of interdigitating grooved rollers providing for heating of the precursor film before entering the nip of the rollers.

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69 The process of claim 69 wherein the step of passing the layers between at least one pair of interdigitating grooved rollers further comprises contacting the composite with the surface of one of the interdigitating grooved rollers that has been heated in the

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range of from 160°F to 220°F for at least one-fourth of a revolution before entering the nip between the pair of interdigitating grooved rollers providing for heating of the precursor film before entering the nip of the rollers.

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73 The process of claim ~~67~~¹¹⁷ wherein the initial basis weight (weight/area) of the precursor film is from 1.5 to 3 times the basis weight of the film after stretching.

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74 The process of claim ~~68~~³⁶ wherein the initial basis weight (weight/area) of the precursor film is from 1.5 to 3 times the basis weight of the film after stretching.

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75 The process of claim ~~69~~³³ wherein the initial basis weight (weight/area) of the precursor film is from 1.5 to 3 times the basis weight of the film after stretching.

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76 The process of claim ~~67~~¹¹⁷ further comprising the step of ensuring that the film composite is at least 160°F as it enters a nip of the at least one pair of interdigitating grooved rollers.

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77 The process of claim ~~68~~²⁶ further comprising the step of ensuring that the film composite is at least 160°F as it enters a nip of the at least one pair of interdigitating grooved rollers.

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78 The process of claim ~~69~~³³ further comprising the step of ensuring that the film composite is at least 160°F as it enters a nip of the at least one pair of interdigitating grooved rollers.

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79 The process of claim ~~67~~¹¹⁷ further comprising the step of preheating the film composite to at least 160°F before passing it through the at least one pair of interdigitating grooved rollers.

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80 The process of claim ~~68~~²⁶ further comprising the step of preheating the film composite to at least 160°F before passing it through the at least one pair of interdigitating grooved rollers.

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31-81 The process of claim 69 further comprising the step of preheating the film composite to at least 160°F before passing it through the at least one pair of interdigitating grooved rollers.

22-82 The process of claim 67 wherein the WVTR is greater than 1000 g/m²/day at 38°C and 90% relative humidity.

31-83 The process of claim 68 wherein the WVTR is greater than 1000 g/m²/day at 38°C and 90% relative humidity.

38-84 The process of claim 69 wherein the WVTR is greater than 1000 g/m²/day at 38°C and 90% relative humidity.

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23-85 The process of claim 67 wherein in the step of providing a film composite, at least the first layer is embossed to impose thereon a pattern of multiple film thickness.

32-86 The process of claim 68 wherein in the step of providing a film composite, at least the first layer is embossed to impose thereon a pattern of multiple film thickness.

33-87 The process of claim 69 wherein in the step of providing a film composite, at least the first layer is embossed to impose thereon a pattern of multiple film thickness.

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24-88 The process of claim 67 wherein the second layer is formed from a polymer composition comprising a polyolefin selected from the group consisting of polyethylene and polypropylene, and combinations thereof, and a filler in a concentration of from about 20 to about 250 parts filler per hundred parts the polymer composition.

25-89 The process of claim 68 wherein at least the second layer is embossed to impose thereon a pattern of multiple film thickness.